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Review Article

## Surgery of Giant Liver Hemangioma: Enucleation versus Resection -A Brief Review -

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## ABSTRACT

Hemangioma is the most common primary tumor of the liver and it is often diagnosed incidentally.

Giant liver hemangioma is defined by a diameter larger than 5 cm. Expectant management is justified in patients with asymptomatic or non-complicated giant liver hemangioma. Surgery remains the most effective therapeutic modality for treatment. Surgical excision is indicated in symptomatic or complicated giant liver hemangioma, rapid growth in size or when diagnosis remains inconclusive. Both enucleation and resection can be employed as surgical procedure to treat giant liver hemangioma. However most authors preferred and advocated enucleation than the anatomic resection. This preference for enucleation lies on the reported results of studies which demonstrated that enucleation was safer, quaker surgical procedure to remove liver giant hemangioma with lower complication and less blood loss.

**Keywords:** Giant liver hemangioma; Resection; Enucleation; Morbidity

## INTRODUCTION

Hemangioma is the most common primary tumor of the liver. The Liver hemangiomas are usually diagnosed incidentally, and most of them are small (<1 cm in diameter). The hemangioma is qualified giant when having a diameter larger than 5 cm.

## OBSERVATION

Asymptomatic giant liver hemangiomas even very large lesions can be safely observed with low rate of adverse events [1]. However, the indications of surgery for giant liver hemangioma are well defined. When surgery, which is the most effective treatment procedure, is indicated, giant liver hemangioma can be excised by resection or enucleation with a low risk of morbidity and mortality [1-3].

### Enucleation versus resection

The management of Giant Liver Hemangioma (GLH) varies from observation to a variety of nonsurgical and surgical procedures. Asymptomatic Giant Liver Hemangioma (GLH) is managed conservatively even in patients with extremely large hepatic hemangiomas by supervision through regular imaging control with lower risk of adverse events [1]. However, surgical options including enucleation, liver resection, and liver transplantation can be considered to treat GLH surgically. These surgical procedures are more radical than the nonsurgical methods and allow histologic examination of the specimen [2]. Surgical excision is indicated in case of symptomatic or complicated lesions. Thus symptomatic giant hemangioma with severe progressive symptoms not medically controlled, Consumptive coagulopathy or Kasabach-Merritt syndrome which is characterized by thrombocytopenia secondary to platelet sequestration and destruction within the hemangioma, and spontaneous rupture with bleeding are commonly the most indication for surgery [3-8]. The rapid growth tumor is considered as an indication for surgery however a minimum of 25% increase in largest diameter over a period of 6 months is required to justify surgical treatment for asymptomatic hemangiomas [7,9-13]. Diagnostic uncertainty with inability to exclude malignancy was another criterion for surgery, but the diagnostic certainty is currently established in most cases with combined use of advanced various imaging techniques [12-14].

Although there is no agreement on the optimal management for giant liver hemangioma, surgery remains the most effective therapeutic modality for treatment [15]. When surgery is indicated, the surgical excision is the most effective procedure to treat hemangioma. Thus resection and enucleation are the two most used surgical procedures to surgically treat liver hemangioma with very

low associated morbidity and mortality. Some authors advocate liver resection [16,17], but others advocate enucleation [2,18,19].

Liver resection is the first surgical procedure used to treat hemangioma. Since, Couinaud defined the segmental anatomy and the avascular planes; performing hepatectomy had become a safer surgical procedure. Hepatic resection can be anatomic or nonanatomic. However, anatomic resections are preferred by authors because it is associated with reduced intraoperative blood loss and reduced need to red cell transfusion [12,20]. Originally, resection was the surgical procedure of choice to treat liver hemangioma until the first description of enucleation technique by Alper, et al. [2]. The enucleation technique is based on the macroscopic observation that hemangiomas are encapsulated by a dissection plane separating hemangioma and liver parenchyma [21]. The presence of this definite and easily separable cleavage plane makes ligation of vessels entering or leaving the hepatic hemangioma much simpler and decreases the risk of intraoperative bleeding and blood loss. Also the absence of bile ducts in the enucleation dissection plane reduces the risk of postoperative bile leak. Moreover enucleation preserves more healthy liver parenchyma avoiding unnecessary parenchyma loss for the treatment of benign tumor [7,15]. Compared to peripherally located hemangiomas, enucleation of centrally located hemangiomas is more likely associated with longer operative time and higher rate of blood loss and transfusion [22]. However, the risk of bleeding and blood transfusions is to be more related to hemangioma size than to the type of surgical technique [11,23]. Thus blood transfusion was more needed in patients with hemangiomas larger than 10 cm in size [12].

The choice of resection or enucleation of Giant Liver Hemangioma (GLH) is mainly dependent on the multiple factors. The existence of easily recognizable and cleavable fibrous tissue separating hemangioma and normal liver parenchyma [11]. The location of lesion, enucleation is indicated in peripheral and right sided located hemangioma and resection is more preferred in centrally located lesion. The tumor size can influence the type of surgical technique. As previously mentioned, very large hemangioma (>20 cm) is associated with high risk of operative bleeding and blood loss and in such condition surgical resection is more suitable [24,25]. In order to preserve more normal liver parenchyma, enucleation is a convenient surgical method to treat multiple liver hemangiomas [11,26,27]. In emergency situation as bleeding and ruptured hemangioma with hemoperitoneum, liver resection is more preferable to avoid aggravation of a serious situation and to minimize the risk of operative complications [15]. When the hemangioma is located near or compresses large vessels with high risk of operative severe bleeding, resection is more suitable [21-24]. Also, the choice to perform enucleation or resection depends partly on the preference and the technical skills of surgeon [26,27].



Regarding the progress made in liver surgery, enucleation meets the requirement of precise liver surgery which is precision, minimal invasiveness, and effectiveness and it can thus be adopted by more and more surgeons [28]. Recent reported meta-analyses [29,30] comparing outcomes of enucleation versus those of anatomic resection of GLH concluded that, there was no surgery-related death in either the enucleation or the anatomic resection procedure, and enucleation was associated with significantly lower blood loss, lower surgical time, and lower risk of complications. Therefore, performing enucleation is simpler than resection with reduced operative blood loss due to the presence of easily cleavable dissection plane between hemangioma and normal liver parenchyma, and with lower morbidity [31]. Enucleation is advocated by most authors because it is safer and quicker with lower overall complications and less blood loss [26,32].

## CONCLUSION

Giant liver hemangioma can be removed safely by either enucleation or anatomic resection. Enucleation preserves more normal liver parenchyma, decreases operative blood loss and reduces postoperative complications. Therefore enucleation may become the preferable choice for surgeons and it should be the preferred surgical procedure for suitable lesions.

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